Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington DC 20554

In the Matter of	)	
	)	
Wireless Telecommunications Bureau and	)	**WT Docket No. 24-240**
Office of Engineering and Technology Seek	)	**RM-11989**
Comment on NextNav Inc. Petition for	)	
Rulemaking	)	

Comments of PrePass Safety Alliance in OPPOSITION to the Petition

Organization of PrePass Comments

1. **Introduction of PrePass Safety Alliance**
2. **The uses of PrePass RFID transponders**
3. **The numbers involving PrePass transponders and their use**
4. **Why PrePass transponders are threatened by the NextNav petition**
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Introduction of PrePass Safety Alliance. PrePass Safety Alliance (Alliance) is a non-profit corporation focused on commercial transportation safety. As a public/private partnership (P3), the Alliance brings together federal, state, and trucking industry decision-makers to advance safety and efficiency on our Nation's highways.

PrePass weigh station bypass began in the late 1980s as a collaborative research project between state transportation directors in six states and trucking company executives. Using state and Federal Highway Administration funding, the Crescent Project sought to make highways safer and more efficient by using technology to identify and weigh trucks at highway speeds and allow safe, compliant trucks to bypass weigh stations. This technology enabled commercial vehicle enforcement efforts to focus on trucks more likely to need attention.

After rigorous testing of various technologies, Radio Frequency Identification Detection (RFID) emerged as the clear choice for weigh station bypass, also known as preclearance. Its superior accuracy and reliability, validated through the Crescent Project's studies, cemented its position. These findings also demonstrated the effectiveness of electronic vehicle identification and weigh-in-motion technologies and the ease with which states could deploy them to enhance safety and efficiency.

Equipped with this new technology, the pilot states established Heavy-vehicle Electronic License Plate, Inc. or HELP Inc. (now known as PrePass Safety Alliance) in 1993 as a non-profit public private partnership to operate the PrePass weigh station bypass program. It's worth noting that PrePass is entirely and voluntarily supported by the trucking industry, a testament to its widespread acceptance and success. To date, 37 states have formed relationships with the Alliance to deploy PrePass, creating what was the first and has become the largest, most reliable, and widespread truck safety preclearance system in the Nation. The Alliance has invested over $1 billion to build and maintain the Nation's largest connected vehicle-to-infrastructure network to facilitate weigh station bypass. PrePass RFID transponders are also interoperable in five additional states, Washington, Oregon, Idaho, South Dakota, and New York, that own and operate their own bypass systems and British Columbia's *Weigh2GoBC* program.

The same RFID technology supporting the PrePass weigh station bypass program today also supports electronic tolling on toll roads, bridges, turnpikes, and tunnels throughout the Nation. Both uses of PrePass RFID transponders are discussed below.

PrePass Safety Alliance is governed by 22 state members[1] with a board of directors composed equally of state commercial vehicle enforcement agencies and trucking industry representatives. Throughout its history, the Alliance has remained a non-profit with a mission to improve safety and efficiency on America's highways.

The uses of PrePass RFID transponders. In *weigh station bypass*, trucks enrolled in the PrePass program are equipped with RFID transponders that communicate in the 915 MHz band. The transponder transmits a unique identifier to roadside readers in advance of weigh station facilities, which is correlated to the truck's weight, obtained by a weigh-in-motion (WIM) scale. The PrePass system then checks the motor carrier's safety record, credential compliance, and truck weight against the state's bypass criteria. If the vehicle meets the requirements, the driver receives a signal on the transponder to bypass the station. All other trucks must enter the weigh station, where commercial vehicle enforcement can take additional actions, including a vehicle and driver inspection, to confirm compliance with all requirements.

PrePass RFID transponders are also central to an ongoing pilot project by the Federal Motor Carrier Safety Administration (FMCSA) focused on collecting an enhanced set of driver and vehicle data from trucks operating at highway speeds to support highway safety.

Weigh station bypass benefits both trucking and commercial vehicle compliance and law enforcement. A Federal Highway Safety Administration study determined the value of each bypass to a motor carrier at $8.68, saving them .4 gallons of fuel and an average of 10 minutes. Trucks often pass several weigh stations each workday, multiplying the impact.

Without bypass, enforcement personnel would face significantly more truck traffic in weigh stations, potentially overwhelming commercial vehicle law enforcement resources and making it more challenging to identify trucks needing attention. Less effective commercial vehicle compliance efforts due to the lack of bypass would have an adverse impact on highway safety for all motorists.

Weigh station bypass provides two additional benefits:

- Bypass reduces the potential of accidents involving trucks merging off and on the highway when entering and leaving weigh stations.
- Bypass reduces harmful emissions when safe and compliant trucks do not have to slow down into, idle at, and accelerate from weigh stations.

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[1] Arizona, Colorado, Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Montana, Nebraska, New Mexico, Ohio, Oklahoma, Tennessee, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.

In *electronic tolling*, RFID toll tags and transponders connect with toll facility readers, allowing the incurred toll to be automatically charged to the correct account. Without RFID toll tags and transponders on commercial and passenger vehicles, toll facilities are forced to use far less accurate and more costly means to identify vehicle owners and assign charges to the correct accounts, leading to much higher toll rates for those transactions.

Electronic tolling has two other benefits, similar to weigh station bypass:

- Electronic tolling supports highway safety – studies have shown that most toll road accidents occur near toll plazas, where vehicles are changing lanes, slowing, and re-accelerating.
- Electronic tolling allows continued vehicle operation at highway speed, lessening the pollution caused by vehicles' deceleration and acceleration as they enter and exit toll booths.

The numbers involving PrePass RFID transponders and their use.

Weigh station bypass.

- Over 100,000 qualified motor carriers equip more than 750,000 trucks with PrePass transponders and receive 125,000 bypasses at 383 RFID-equipped weigh stations in 41 states each day, 1.1 billion safe and legal bypasses since the program began. Every one of those bypasses frees up commercial vehicle enforcement personnel to focus on trucks needing attention – improving highway safety for all motorists.
- Since 1997, trucks equipped with PrePass RFID transponders have reduced commercial vehicle emissions by over 975,000 metric tons and saved motor carriers over 440 million gallons of fuel, 92 million driver hours on the road, and $8.6 billion in operational cost savings.
- PrePass has invested over $1 billion to build and maintain the Nation's largest connected vehicle-to-infrastructure system to support weigh station bypass.

Electronic tolling:

- 346[2] tolling facilities in 35 states rely on RFID communications for electronic tolling.
- Over one million commercial vehicles carry RFID tolling transponders from third-party electronic toll payment providers to access the lowest available toll rates. PrePass tolling transponders alone facilitate the electronic collection of $1.2 billion annually on behalf of toll facilities.
- Together, RFID toll tags and transponders on passenger cars generate $20 billion annually in revenue for toll roads, bridges, turnpikes, and tunnels according to the International Bridge, Tunnel and Turnpike Association (IBTTA) – revenue that supports host states and cities, the building and maintenance of infrastructure, and returns for private investors.

All of the benefits arising from RFID transponders in the Lower 900 MHz Band are threatened by the NextNav petition.

Why PrePass transponders are threatened by the NextNav petition.

PrePass RFID bypass and toll transponders operate at the 915 MHz base frequency. All bypass transponders generate their own transmit signals using Time Division Multiple Access (TDMA) modulation and are licensed Part 90 devices with EIRP (Effective Isotropic Radiated Power) <10mW and receive sensitivity of -34 dBmd. Tolling transponders that generate their own transmit signals use the TDM protocol and are also Part 90 devices with lower transmit power than TDMA devices. There also exist tolling transponders that rely on backscatter modulation of the energy from roadside readers. Weigh station bypass or electronic tolling readers are normally Part 90 licensed devices with ERP (Effective Radiated Power, relative to a dipole antenna) up to the FCC limit of 30W. Other stations that read tolling transponders may be Part 15 devices and are allowed EIRP of 4 watts (36 dBm) under FCC rules. PrePass readers operate between the frequency of 912-918 MHz with maximum power output of 1.31 Watts.

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[2] Knopp, M. (2021). Nationwide Electronic Toll Collection Interoperability https://ops.fhwa.dot.gov/publications/fhwahop21023/fhwahop21023.pdf. Federal Highway Administration.

All RFID transponders and readers will be subject to severe interference from the more powerful signals proposed by NextNav. As an example, NextNav's current MBS (Metropolitan Beacon Signal) stations themselves transmit at 45 dBm (30 watts) ERP, over 3000 times more powerful than RFID transponders. The MBS transmission results in a typical received signal power of approximately -80 dBm at 1-km range – for comparison purposes, about 100,000 times (50 dB) higher than the nominal received signal power for GPS (GPS operates in a different frequency band).

The reader antennas for receiving RFID transponder signals, whether for weigh station bypass or for electronic toll collection, are pointed upstream to communicate with oncoming vehicles at highway speeds. That makes them susceptible at greater distances to MBS signals, which operate in the 920-928 MHz frequency band.

The difference in power between RFID low-power systems and NextNav's high-power MBS (which uses higher power signals) is not enough to prevent interference and does not account for signal backscatter, especially important as the proposed rules in the NextNav petition would eliminate the current "safe harbor" protection FCC accords low power uses.

But the NextNav *system* is proposed at 2000 Watts/MHz ERP with 10 MHz bandwidth – **660 times more powerful than its current MBS stations**. The interference from PNT base stations would be substantial, no matter the location of the base station.

In addition, NextNav proposes to lease those portions of the 902-907 MHz band and the 918-928 MHz band it does not utilize to 5G wireless providers. The FCC presently requires 5G wireless communications, with their high-power signals, to operate below 850 MHz, thus protecting the *entire* Lower 900 MHz Band from 5G interference. Now, NextNav would invite that interference *within* the Lower 900 MHz Band itself and does not propose any buffer between these 5G services and existing incumbent uses, just as NextNav proposes to eliminate the current "safe harbor" protection FCC accords low power uses in general.

The interference with PrePass toll transponders from NextNav transmissions is further illustrated by the attached technical analysis by Neology.

To be clear, the distance from NextNav PNT base stations and 5G wireless provider towers to RFID transponders and readers may be irrelevant, as both the NextNav PNT system and the 5G wireless providers who may lease from NextNav will also work through mobile communication units – headsets, mobile radios, and, of course, cell phones. Those mobile devices, by definition, may be in use near or next to RFID transponders and readers – in fact, they may at times be in the very vehicles relying on RFID transmissions for weigh station bypass and electronic tolling. These devices would block transponder reception of reader signals and can interfere with the reader reception of transponder signals from the same or other vehicles.

This is also why, between the power of the NextNav PNT signals and 5G wireless communications, plus their use on mobile devices, toll tags on passenger cars and commercial vehicles would be rendered completely useless under the NextNav proposal.

Today's RFID transponders cannot be retuned or retrofitted with filters to eliminate interference from the proposed NextNav PNT network and 5G wireless communications. The RFID transponders cannot be exchanged for devices calibrated to another MHz band, in an effort to "relocate" electronic tolling and weigh station bypass away from NextNav and 5G interference – imagine trying to exchange toll transponders in over 86 million[3] commercial and private vehicles, or weigh station transponders in 750,000 trucks, plus the cost to retrofit (if even possible) all toll facilities and 383 weigh stations across the Nation. The disruption and cost of changing devices and infrastructure would immediately impact highway safety, slow the supply chain, and drive up consumer prices for years to come.

For all these reasons, the NextNav petition must be rejected in its entirety.

Answers to specific questions asked by the FCC. (References are to the sections and page numbers of the FCC Public Notice.)

- **[Public Notice for Comment, *Identification, and Protection of Incumbents*, Page 4]** FCC asks about the status of NextNav outreach.

  Answer: NextNav has not reached out to PrePass Safety Alliance nor any of the organizations, associations, or coalitions it has contacted on this matter.

- **[Public Notice for Comment, *Identification, and Protection of Incumbents*, Page 4]** FCC asks whether incumbents can continue to operate in the 11 MHz band proposed by NextNav.

  Answer: Tens of millions of RFID devices and tags would be rendered useless due to interference from the NextNav PNT system operating in the Lower 900 MHz Band.

  Power Concerns: The NextNav system is proposed at 2000 Watts/MHz ERP with 10 MHz bandwidth – 660 times more powerful than its current MBS stations. This substantial increase in power raises concerns about significant interference from PNT base stations, regardless of their location.

  Leasing of Spectrum: NextNav plans to lease unused portions of the 902-907 MHz and 918-928 MHz bands to 5G wireless providers. Currently, the FCC restricts 5G wireless communications, with their high-power signals, to operate below 850 MHz, thus protecting the Lower 900 MHz Band from interference. However, NextNav's proposal could introduce 5G interference directly into this band, without proposing any buffer zones to protect existing incumbent uses, thereby threatening the "safe harbor" protections currently in place for low-power uses.

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[3] Knopp, M. (2021). *Nationwide Electronic Toll Collection Interoperability https://ops.fhwa.dot.gov/publications/fhwahop21023/fhwahop21023.pdf.* Federal Highway Administration.

Interference with Toll Transponders: The potential interference with RFID transponders is highlighted by the attached technical analysis from Neology. The concern is that the proximity of NextNav PNT base stations and 5G wireless towers to RFID transponders and readers could render these devices useless. This issue is exacerbated by the fact that both the NextNav PNT system and 5G providers utilize mobile communication devices (e.g., cell phones, mobile radios), which will operate in close proximity to RFID readers, including in vehicles that rely on these systems for electronic tolling and weigh station bypass.

In summary, the combination of high-powered NextNav PNT signals, potential 5G interference within the Lower 900 MHz Band, and the use of mobile devices could severely disrupt the operation of RFID-based toll systems, making them ineffective under NextNav's proposal.

- **[Public Notice for Comment, *Identification, and Protection of Incumbents*, Page 4]** FCC also seeks "details regarding incumbent relocation."

  Answer: Relocating current RFID toll systems would require retrieval of over 86 million RFID toll tags and transponders in vehicles, including over 1 million in commercial trucks for reprogramming or replacement. Relocating the bypass RFID system would require retrieval of over 750,000 transponders as well. These activities would severely impact highway safety, disrupt the supply chain, drive up consumer prices, and compromise commercial vehicle enforcement efforts. The cost to retrofit (if possible) 346 tolling facilities and 383 weigh stations across the Nation is operational and cost prohibitive and not in the public interest.

- **[Public Notice for Comment, *Identification and Protection of Incumbents*, Page 4]** With respect to part 15 devices, NextNav states that it is completing technical analyses and "will work with unlicensed users to understand their spectrum requirements."

  Answer: As mentioned, NextNav has not contacted PrePass Safety Alliance nor any organization, association, or coalition the Alliance has contacted on this matter.

- **[Public Notice for Comment, *Identification, and Protection of Incumbents*, Page 4]** NextNav does, however, seek the removal of the current requirement that it not cause unacceptable levels of interference to part 15 devices. In fact, NextNav states that the "limited number" of part 15 devices should not particularly require protection.

  Answer: There are approximately 86 million RFID toll tags and transponders on private and commercial vehicles, including one million commercial trucks and 750,000 RFID bypass transponders on commercial trucks. Other industries noted in the "Lower 900 MHz Spectrum Utilization" documents attached have deployed tens of millions of RFID tags and devices ranging from critical health care monitoring to U.S. Military combat radio systems to package tracking by America's largest retailers and delivery services.

  The FCC created this spectrum to allow and protect these uses, and the incumbents, who have invested billions of dollars in systems that cooperatively operate in the Lower 900 MHz Spectrum, have a reasonable expectation that it continues to do so.

- **[Public Notice for Comment, *Identification, and Protection of Incumbents*, Page 4]** The FCC seeks comment on the extent of part 15 devices and amateur operations in the band and what potential impact band reconfiguration and flexible use rules, including elimination of the testing requirements of current rule section 90.353(d),30 might have on part 15 devices and on the amateur community. What services are being provided by part 15 devices and amateur operations in this band?

Answer:

Weigh station bypass:

- Over 100,000 qualified motor carriers equip more than 750,000 trucks with PrePass transponders and receive 125,000 bypasses at 383 weigh stations in 41 states each day, 1.1 billion safe and legal bypasses since the program began. Every one of those bypasses frees up commercial vehicle enforcement personnel to focus on trucks needing attention – improving highway safety for all.
- Since 1997, trucks equipped with PrePass RFID transponders reduced commercial vehicle emissions by over 975,000 metric tons, and saved motor carriers over 440 million gallons of fuel, 92 million driver hours on the road, and $8.6 billion in operational cost savings.
- PrePass has invested over $1 billion to build the Nation's largest connected vehicle-to-infrastructure system to support weigh station bypass.

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- 346 tolling facilities in 35 states rely on RFID communications for electronic tolling.
- One million commercial vehicles carry RFID tolling transponders from third-party electronic toll payment providers to access the lowest available toll rates. PrePass tolling transponders alone facilitate the electronic collection of $1.2 billion annually on behalf of toll facilities.
- Together, RFID toll tags and transponders on commercial and passenger vehicles generate $20 billion annually in revenue for toll roads, bridges, turnpikes, and tunnels, according to the International Bridge, Tunnel and Turnpike Association (IBTTA) – revenue that supports host states and cities, the building and maintenance of infrastructure, and returns for private investors.

The NextNav petition threatens all of the benefits arising from RFID transponders in the Lower 900 MHz Band.

- **[Public Notice for Comment, *Identification and Protection of Incumbents*, Page 4]** FCC asks whether existing uses may be accommodated in other spectrum bands.

  Answer: No. PrePass Safety Alliance has invested over $1 billion to build and maintain the Nation's largest connected vehicle-to-infrastructure network to support the PrePass weigh station bypass system and invested millions more to deploy bypass and toll transponders in commercial vehicles.

  Toll agencies nationwide have invested far more in infrastructure and over 86 million toll tags and devices because they are the most accurate and reliable means to collect $20 billion in tolls every year.

  The cost of adapting the current infrastructure at 346 toll plazas and 381 weigh station bypass sites to operate on a different spectrum and develop and deploy tens of millions of new devices would be prohibitive.

- **[Public Notice for Comment, *Identification and Protection of Incumbents*, Page 4]** FCC asks additional questions on costs (relocation, etc.)

  Answer: The cost to adapt current infrastructure at 346 toll plazas and 381 weigh station bypass sites to operate on a different spectrum, and develop and deploy tens of millions of new devices would be several billion dollars to states and non-profit organizations in the toll and bypass industries alone.

  The cost for other industries which have also invested heavily in systems that operate in the Lower 900 MHz Spectrum is simply too large to estimate and would negatively impact the supply chain, U.S. postal service, healthcare facilities and devices, major delivery companies and retailers, smart utility meters, U.S. military systems, and many others. See the attached "Lower 900 MHz Spectrum Utilization" documents for a partial list of incumbents.

  These organizations invested billions of dollars in systems dependent on the Lower 900 Spectrum, reasonably expecting that the FCC would continue to protect.

- **[Public Notice for Comment, *Spectrum Swap, Increased Flexibility, and Potential Windfall*, Page 5]** FCC notes that NextNav proposes to "use a small amount of the 10-megahertz capacity," and that it would partner with 5G wireless providers to use the excess capacity for broadband. Later in that section, FCC seeks comments on allowing NextNav "rights to lease" almost 10 megahertz of the spectrum.

  Answer: Current FCC rules require 5G wireless providers to operate below 850 MHz to protect the *entire* Lower 900 MHz band. Allowing NextNav to lease out parts of the Lower 900 MHz Band to 5G providers would contravene FCCs own protections of the Lower 900 MHz Band and confirm that interference with incumbent uses is likely.

  Answer (continued): Granting NextNav the ability to control and then commercially lease out sections of the Lower 900 MHz band should be contrasted to the types of uses already in place, from the non-profit PrePass serving highway safety to electronic tolling serving public convenience. As mentioned, multiple incumbent uses by many sectors of the economy, including healthcare, security, and the military would also be subjected to NextNav and 5G interference.

PrePass Safety Alliance respectfully requests the FCC to reject the NextNav petition entirely.